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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/802,259 | 03/17/2004 | Robert H. Blick | 032026-0761 | 4314 |
| 23524 | 7590 | 08/26/2005 | EXAMINER | |
| FOLEY & LARDNER 150 EAST GILMAN STREET P.O. BOX 1497 MADISON, WI 53701-1497 | | | TRAN, MAI HUONG C | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2818 | |

DATE MAILED: 08/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | | |
|------------------------------|------------------------|--|---------------------|--|
| Office Action Summary | Application No. | | Applicant(s) | |
| | 10/802,259 | | BLICK ET AL. | |
| | Examiner | | Art Unit | |
| | Mai-Huong Tran | | 2818 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) 21-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 and 26-44 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 August 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>8/6/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restriction

Applicant's election with traverse of Group II (claims 1-20 and 26-44) drawn to process of making a semiconductor device is acknowledged. Accordingly, claims 21-25 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Applicant has the right to file a divisional application covering the subject matter of the non-elected claims.

The traversal is on the ground(s) that see the election paper. This is not found persuasive because the fields of search for method and device claims are NOT coextensive and the determinations of patentability of method and device claims are different, that is process limitations and device limitations are given weight differently in determining the patentability of the claimed inventions. Also, the strategies for doing text searching of the device claims and method claims are different. Thus, separate searches are required.

The requirement is still deemed proper and is therefore made **FINAL**.

Claim Rejections - 35 U.S.C. § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-20 and 26-44 are rejected under 35 U.S.C. 103 (a) as being unpatentable over U.S. Patent No. 6,379,988 to Peterson et al. in view of the remark.

Regarding to claim 1, Peterson discloses a method of forming microelectromechanical structures comprising providing a microelectromechanical structural feature 24 supported on a layer of sacrificial material 26 and connected to a larger structural element (fig. 4G); applying a film (col. 12, line 16) onto the structural feature by energy beam assisted deposit of material from a vapor (col. 12, lines 15-16) through which the beam passes to cover at least a portion of the structural feature; applying a wet etchant to the structural feature covered by the film and to the sacrificial layer supporting the structural feature, the wet etchant selected to etch the sacrificial layer material preferentially as compared to the structural feature and to the film covering it to leave the structural feature supported by its connection to the larger structural element;

and removing the covering film from the structural feature (col. 8, lines 57-67, col. 11, lines 47-52). However, Peterson does not disclose nanomechanical structures (NEMS).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form nanomechanical structures (NEMS) since it was known in the art to form nanomechanical structures (NEMS) instead of microelectromechanical structures.

Regarding to claim 2, the method wherein the vapor contains carbon and wherein the film deposited on the structural feature comprises a carbon film (col. 12, line 16).

Regarding to claims 3, 14, 22, 28, and 37, Peterson discloses the claimed invention except for the method wherein the carbon film is deposited to a thickness of at least 5 nm.

It would have been obvious to one having ordinary skill in the art at the time of the invention was made to form the carbon film to a thickness of at least 5 nm, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding to claims 4, 9, 39, and 41, the method wherein the energy beam is an electron beam that is scanned over the structural feature (col. 12, lines 15-20).

Regarding to claims 5, 15, 23, 29, and 38, Peterson discloses the claimed invention except for the method wherein the carbon film is deposited to a thickness of 40 to 50 nm.

It would have been obvious to one having ordinary skill in the art at the time of the invention was made to form the carbon film to a thickness of 40 to 50 nm, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding to claims 6, 27, and 36, the method wherein removing the covering film of carbon is carried out by oxygen plasma etching (col. 9, lines 18-19).

Regarding to claims 7, 16, 24, and 30, the method wherein the structural feature is formed of silicon, the sacrificial layer is formed of silicon dioxide (col. 8, lines 11-12), and the wet etchant is buffered hydrofluoric acid (col. 9, lines 32-35).

Regarding to claims 8, 17, 25, 31, and 40, Peterson discloses the claimed invention except for the method wherein the structural feature has a cross-sectional dimension that is 500 nm or less.

It would have been obvious to one having ordinary skill in the art at the time of the invention was made to form the structural feature that has a cross-sectional dimension that is 500 nm or less, since it has been held that discovering an optimum value of a result

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effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding to claims 10, 18, 32, and 42, the method wherein the electron beam is provided by a scanning electron microscope (col. 12, lines 15-20).

Regarding to claims 11, 19, and 43, the method wherein the vapor is an organic vapor present in a sample chamber of the scanning electron microscope (col. 12, lines 15-20).

Regarding to claims 12, 20, 34, and 44, the method wherein the electron beam is scanned over the structural feature and over an opening between the structural feature and adjacent structure to form a film extending over the opening between and connecting the structural feature and the adjacent-structure microscope (col. 12, lines 15-20, figs. 2c, 2d).

Regarding to claim 13, Peterson discloses a method of forming microelectromechanical structures comprising providing a microelectromechanical structural feature, supported on a layer of sacrificial material 26 and connected to a larger structural element (fig. 4G); applying a film of carbon (col. 12, line 16) onto the structural feature by scanning an electron beam over the structural feature to deposit

material from a vapor containing carbon through which the beam passes to cover at least a portion of the structural feature (col. 12, lines 14-19); applying a wet etchant to the structural feature covered by the film and to the sacrificial layer supporting the structural feature, the wet etchant selected to etch the sacrificial layer material preferentially as compared to the structural feature and to the film covering it to leave the structural feature supported by its connection to the larger structural element (col. 9, lines 25-38, col. 11, lines 47-52); and removing the covering film from the structural feature by oxygen plasma etching (col. 9, lines 18-20).

Peterson does not disclose the nanomechanical structural feature having at least one cross-sectional dimension of 500nm or less.

It would have been obvious to one having ordinary skill in the art at the time of the invention was made to form the nanomechanical structural feature that has a cross-sectional dimension that is 500 nm or less, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding to claim 26, Peterson discloses a method of forming structural features on a semiconductor base comprising providing a structural feature on a semiconductor base; applying a film of carbon (col. 12, line 16) onto the structural feature by scanning an electron beam over the structural feature to deposit material from a vapor containing carbon through which the beam passes to cover at least a portion of the structural feature

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(col. 12, lines 4-20); applying a wet etchant to the structural feature covered by the film and to the semiconductor base, the wet etchant selected to etch material of the semiconductor base preferentially as compared to the film covering the structural feature; and removing the covering carbon film from the structural feature (cols. 7-13).

Regarding to claim 35, Peterson discloses a method of releasably holding structural features on a base comprising providing a structural feature on a surface of a base; applying a film of carbon onto the structural feature by energy beam assisted deposit of material from a vapor containing carbon through which the beam passes to cover at least a portion of the structural feature and an adjoining portion of the surface of the base to hold the structural feature in place on the base; and removing the covering carbon film from the structural feature (cols. 7-13).

Conclusion

Any inquiry concerning this communication on earlier communications from the examiner should be directed to Mai-Huong Tran, (571) 272-1796. The examiner can normally be reached on Monday-Thursday from 8:00 AM to 6:30 PM. The examiner's supervisor, David Nelms can be reached on (571) 272-1787.

The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR, Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to be 'MHT' or similar, located below the main text block.A handwritten signature in black ink, appearing to be 'Mai-Huong Tran', located to the right of the main text block.

Mai-Huong Tran